3. DESIGN BASIS

3.1 Status of Record of Decision Assumptions

The bounding assumptions under which the Group 5 RD/RA activities will be performed include the assumptions presented below. These assumptions describe the limiting factors and conditions under which the RD/RA activities will be performed. The general assumptions relative to OU 3-13 Group 5 include the following:

- Monitoring for each group will be performed as part of RD/RA and is separate from institutional controls.
- A minimum institutional control period to the year 2095 for land use or access restrictions required to be protective will be implemented at all sites where contaminant concentrations exceeding allowable risk ranges are left in place. The continued need for land use or access restrictions will be evaluated by the agencies during each 5-year review.
- Institutional controls until 2095 will consist of site access controls, radiological posting controls, and land use controls as shown in Table 11-1 of the ROD (DOE-ID 1999).
- The overall RAO for OU 3-13 is to achieve an HI of 1.0 or less and a cumulative increased carcinogenic risk of less than 1×10^{-4}.

In addition to the general assumptions applicable to all groups, the specific assumptions for Group 5, Snake River Plain Aquifer, include the following:

- Institutional controls over the area of the aquifer exceeding the MCLs for H-3, I-129, and Sr-90 will be protective by restricting future groundwater use through use of deed restrictions and regulatory restrictions on drilling, construction, and placement of groundwater wells. Notice of these restrictions will be given to local county governments, such as Shoshone-Bannock (Sho-Ban) Tribal Council, General Services Administration (GSA), and Bureau of Land Management (BLM).
- COCs will meet the groundwater quality standards by the year 2095, based on computer-modeled predictions.
- If the action level of 11.4 pCi/L for I-129 (for the year 2000) is exceeded in selected monitoring wells at a sustainable pump rate of 0.5 gpm for a period of 24 hours (south of the INTEC security fence), then the contingent remediation pump and treat will be implemented.
- Monitoring of the SRPA for Idaho water quality parameters and federal MCLs will be used to evaluate effectiveness of the remedies with specified remediation goals of protecting the SRPA.
- Implementation of the contingent remedy depends upon the results of the groundwater monitoring.
- If groundwater treatment is implemented, the treated water will be returned to the aquifer by land recharge in accordance with Idaho Wastewater Land Application ARARs if a recharge impoundment is used, by discharge to the Big Lost River in accordance with NPDES/SPDES ARARs, or by evaporation in the ICDF Complex evaporation pond or equivalent.
- Long-term monitoring will be required until RAOs are achieved.

3.2 Detailed Evaluation of How ARARs Will Be Met

Table 3-1 contains a list of the ARARs identified in the ROD for Group 5, along with the specific action(s) that will be taken to ensure the ARARs are met.

3.3 Detailed Justification of Design Assumptions

Modeling of the SRPA for the WAG-3 OU 3-13 RI/BRA (DOE-ID 1997a) predicted a future risk to groundwater users due to high concentrations of I-129 and Sr-90 predicted in the low-hydraulic conductivity HI sedimentary interbed beyond the year 2095. However, only a limited amount of empirical data is available to confirm the physical properties of the HI interbed as assumed in the OU 3-13 RI/BRA model and there is no data regarding the presence or absence of contaminants in the interbed. Empirical evidence of the HI interbed contamination and permeability is required to verify the model predictions and refine the model parameterization in the event that observed concentrations exceed the action levels defined in the WAG-3 ROD.

Sensitivity of the model parameterization was performed to identify key data needs and support field activities to collect empirical data. A refined and recalibrated model will then be used to determine if contamination within the HI interbed still presents a risk to groundwater users in the event that observed concentrations exceed action levels. Iodine-129 was chosen as the indicator contaminant for model sensitivity because it is long-lived and was predicted to present the greatest contaminant risk within the interbed. The tasks performed to assess model sensitivity are (1) review of the OU 3-13 RI/BRA model, (2) review of the I-129 source term in the model, (3) sensitivity analysis of HI interbed hydraulic conductivity, and (4) sensitivity analysis of HI interbed thickness and discretization. A more detailed discussion of the RI/BRA modeling and sensitivity of model parameterization is included in Appendix C.

3.3.1 Review of the WAG-3 OU 3-13 RI/BRA Aquifer Model.

The physical and hydrogeologic setting of the INTEC is highly complex, consisting of layers of basalt and sediments. In the vadose zone, the sedimentary interbeds are often saturated, forming perched water zones due to large water sources at the INTEC surface. The geology of the aquifer region is more uniform in the vertical direction than the geology of the vadose zone is. The basalt structures tended to be thicker, and the sedimentary interbeds were fewer in number. USGS studies (Anderson 1991) indicate that the aquifer in the region north of the INTEC and extending south of the RWMC is comprised primarily of the H basalt flow, the HI interbed, and the lower I basalt flow. The I basalt flow is significantly thicker and has a lower permeability than the H basalt flow (Anderson 1991). The HI interbed separates the two basalt flows. Two separate models were used to represent the vadose zone and the aquifer beneath the INTEC. The basis and simulation results for the aquifer model are briefly discussed here.

The aquifer model used four distinct stratigraphic types. These include an upper I basalt unit, a lower I basalt unit, the HI interbed, and the H basalt unit. The upper I basalt structure was assigned permeabilities representative of those obtained from aquifer testing the INTEC pumping and injection wells. The lower I basalt and H basalt structure was assigned regional permeabilities taken from the WAG-10 modeling effort (McCarthy et. al. 1994). The H basalt structure in the vicinity of the vadose zone footprint was assigned local INTEC permeabilities from the pumping tests.

Table 3-1. Compliance with ARARs for Group 5, Snake River Plain Aquifer interim action selected remedy.

Alternative/ARARs citation	Description	Applicable, or Relevant and Appropriate, or TBC[a]	Comments
Group 5—Snake River Plain Aquifer: Alternative 2B—Institutional Controls with Monitoring and Contingent Remediation			
Action-Specific			
IDAPA 37.03.09.025	Idaho well construction standards	Applicable	Applies to SRPA monitoring.
IDAPA 58.01.05.008 (40 CFR 264.114)	Disposal or decontamination of equipment, structures, and soils	Applicable	Applies to drilling, sampling, and treatment equipment that contacts SRPA groundwater.
IDAPA 58.01.01.585, 58.01.01.586	Rules for the control of air pollution in Idaho	Applicable	Will be met by treatment system.
IDAPA 58.01.01.650, 58.01.01.651	Idaho fugitive dust emissions	Applicable	Will be met for contaminated drill cuttings.
40 CFR 61.92, 61.93	NESHAP for radionuclides from DOE facilities, emission monitoring and emission compliance	Applicable	Will be met using engineering and administrative controls.
40 CFR 125	NPDES		Applies if contingent remediation is implemented and treated groundwater is discharged to the Big Lost River.
10 CFR 20, Appendix B	Annual limits for effluent concentrations	Applicable	Applies if treated water is discharged.
40 CFR 122.26	Storm water discharges during construction	Applicable	Substantive requirements will be met.
IDAPA 58.01.05.008 (40 CFR 264.601)	Treatment standards for miscellaneous units	Applicable	Specific requirements will be clarified and met in 10% design.
IDAPA 58.01.17.300	Wastewater land application permit requirements	Applicable	Applies if treated waste water is discharged to a percolation pond; substantive requirements will be met.
IDAPA 58.01.02.400	Rules governing point source discharge	Applicable	Applies if treated waste water is discharged to the Big Lost River.
IDAPA 58.01.02.401	Point source wastewater treatment requirements	Applicable	Applies if treated wastewater is discharged to the Big Lost River.
Chemical-specific			
IDAPA 58.01.05.006 (40 CFR 262.11)	Hazardous waste determination	Applicable	Applicable to groundwater that will be stored long-term or treated.

Table 3–1. (continued).

Alternative/ARARs citation	Description	Applicable, or Relevant and Appropriate, or TBC[a]	Comments
IDAPA 58.01.11.200(a) (40 CFR 141) for:	Groundwater quality standards (primary drinking water standards)	Applicable	This ARAR will be met in the restoration timeframe (2095) in the SRPA contaminant plume outside of the current INTEC security fence. Any recharge to the SRPA will be limited to concentrations so that this ARAR will be met in 2095.
Gross alpha particle activity (including radium-226, but excluding radon and uranium)			
Combined beta/photon emitters			
Combined radium-226 and radium-228			
Strontium-90			
Tritium			
Location-specific			
None identified			
TBCs			
DOE Order 435.1	Radioactive waste management performance objectives to protect workers	TBC	Substantive requirements will be met to protect workers.
DOE Order 5400.5	Exposures to the public will be kept ALARA	TBC	Substantive ALARA requirements will be met to protect the public.

a. TBC = to be considered

To be consistent with the sediment properties used in the vadose zone model, a permeability of 4 mDarcy and a porosity of 0.487 were assigned to the HI interbed, which overlies the I basalt flow. Assigning sediment properties uniformly over the I flow assumed that the HI interbed is 7.6 m (25 ft) thick and exists everywhere the I basalt flow exists. The porosity for the aquifer model basalt was 0.06. This value was derived from calibration of the model to H-3 disposal records and the corresponding H-3 sampling results from wells in the vicinity of the INTEC.

Aquifer Model Calibration for OU 3-13 RI/BRA

The OU 3-13 RI/BRA aquifer flow model relied on the WAG-10 model calibration (McCarthy et. al. 1994) and the hydraulic parameters were not adjusted in the transport calibration process. Calibration of the transport model used the H-3 disposal history in the CPP-03 injection well. The H-3 disposed in CPP-03 provided good calibration data because H-3 is nonsorbing, and because mass disposal history from 1953-1984 along with time histories at wells downgradient are available.

Review of Iodine-129 Source Term

The historical I-129 source term at the INTEC is described in Chapters 5 and 6 of Appendix F of the WAG-3 OU 3-13 RI/BRA report (DOE-ID 1997a). For the RI/BRA study, the INTEC releases were defined as one of three types: (1) known releases, (2) service waste releases, or (3) soil contamination releases. The following contaminant sources were evaluated in the OU 3-13 study:

- The I-129 source from the tank farm releases, based on estimates of the liquid release volumes and the I-129 concentrations in the liquid released. The I-129 contribution from the tank farm is 0.007 Ci, which is 0.5% of the total.

- The I-129 source from the injection well is 1.39 Ci, which is significantly larger than the other sources, accounting for 91.5% of the total I-129 source to the aquifer. The injection well source term was estimated from data in the RWMIS database.

- The I-129 source from the Service Waste Ponds (SWP) is 0.08 Ci, which is approximately 5.4% of the total I-129 source to the aquifer.

- The I-129 source from the soil contamination was calculated to be 0.04 Ci, which is approximately 2.5% of the total I-129 source to the aquifer.

Review of OU 3-13 RI/BRA I-129 Simulation Results

The OU 3-13 RI/BRA modeling predicted a relatively large area of the SRPA will have I-129 concentrations greater than the 1 pCi/L MCL at the year 2095. Two areas of the HI interbed contained I-129 at concentrations above the MCL. The first area is immediately southwest of the INTEC and has a peak concentration of 3.0 pCi/L. The second area is west of Lincoln Boulevard and north of State Highway 20 and has a peak concentration of 1.4 pCi/L. These values are different from those presented in Appendix F of the OU 3-13 RI/BRA because of a coding error in TETRAD version 12.2. The RI/BRA I-129 simulation was rerun with TETRAD version 12.7.

3.3.2 Aquifer Model Sensitivity

Model Discretization Sensitivity

The OU 3-13 aquifer model has been rediscretized to estimate the model sensitivity to a single-layer HI interbed vs. a multiple-layer interbed with bottom surface below the HI interbed. The RI/BRA model treats the vertical component of the HI interbed as a single numerical grid block of constant (7.6 m [25 ft]) thickness. This one grid block discretization averages concentrations throughout the entire depth of the interbed and does not allow a vertical concentration gradient to exist in the interbed. This effect may allow an artificially large amount of mass to enter and remain in the interbed.

The OU 3-13 aquifer model also used a uniform 76-m total thickness, which did not extend below the HI interbed. Placement of the OU 3-13 model's bottom surface above the HI interbed's lowest point presents potential for erroneous low or high velocity areas due extreme confining conditions. The rediscretized model's bottom surface was created from active aquifer thickness estimates, which were below the HI interbed.

The rediscretized model predicts the peak aquifer I-129 concentration will be 0.62 pCi/L in the year 2095. This is in contrast to the OU 3-13 RI/BRA model, which predicted the peak concentration would be 3.0 pCi/L in the year 2095 and a large area of the HI interbed south of the INTEC would remain above the 1.0 pCi/L beyond 2095. This is primarily due to the rediscretization of the HI interbed and placing the model bottom below the HI interbed. Iodine-129 still persists in the rediscretized model's HI interbed, but to a lesser extent of that in the RI/BRA model. In both models, the I-129 takes a relatively long time to enter and exit the interbed compared to basalt. This is because of the low permeability (4 mD compared to approximately 1×10^5 mD) and high porosity (0.487 vs. 0.0625) of the interbed compared to basalt. In the RI/BRA, model I-129 persists longer within and above the HI interbed because of low velocity areas created by the different HI interbed placement. It is important to note that the rediscretized model has not been calibrated to tritium disposal and breakthrough, as the RI/BRA model was. The I-129 plumes in both models are comparable. However, the axis of the rediscretized model's plume has shifted slightly westward.

Model HI Interbed Permeability Sensitivity

The low permeability of the HI interbed is primarily responsible for maintaining elevated I-129 concentrations in the simulated SRPA. There is very little data available on the permeability of the HI interbed. The OU 3-13 RI/BRA aquifer modeling used an interbed permeability (4 mD) from the vadose zone model calibration to perched water bodies beneath the INTEC. There is little confidence that vadose zone calibration adequately represents the HI interbed permeability within the aquifer. HI interbed pumping tests performed by the State of Idaho (Fredrick and Johnson 1996) provide the only hydraulic conductivity information available specifically for the HI interbed. Analysis of the pumping test data suggests the permeability range is 37 mD to 100 mD. Therefore, the 4 mD used for the WAG 3-13 modeling is at least an order of magnitude low. Information on the INTEC vadose zone interbed permeability ranges from 0.05 mD to 3,500 mD. An average permeability of 40 mD is on the low end of the most appropriate permeability value. The 4 mD used in the RI/BRA modeling represents a low bounding value and 200 mD represents a high bounding value.

HI interbed permeability in the RI/BRA and rediscretized models was varied from 4 to 200 mD and peak concentrations and the size of the I-129 plume in 2095 were compared. The area of the remaining plume in 2095 is very sensitive to permeability and monotonically decreases in size with increasing permeability for both models. The RI/BRA model area of the 0.1 pCi/L plume decreased from 70.6 to 45.4 km^2 for the 4 and 200mD interbed permeability, respectively. The rediscretized model 0.1 pCi/L area decreased from 26.4 to 10.2 km^2 for the 4 and 200 mD simulations. The peak concentrations in the year 2095 did not monotonically decrease with increasing permeability. The RI/BRA model's peak values ranged from 2.1 pCi/L for the 8 mD permeability to 3.4 pCi/L for the 40 mD permeability simulation. The rediscretized model's peak values ranged from 0.25 pCi/L for the 40 mD simulation to 4.1 pCi/L (limited to one gridblock aerial extent) for the 8 mD simulation. The varied peak concentrations in 2095 for the different interbed permeabilities indicate flow field substantially changes with different interbed permeabilities, which results in different areas retaining high I-129 concentrations.

3.3.3 Modeling Data Needs

Contaminant concentration data in the aquifer basalt and HI interbed are needed to verify whether modeling is correctly simulating the interaction of basalt and interbed and accurately represents the SRPA. At this time, elevated I-129 and other contaminant concentrations in the interbed are hypothetical, based on modeling. Answering this data need can best be accomplished by gathering a vertical profile of aquifer concentrations above, within, and below the HI interbed at several locations. The area immediately south of the INTEC percolation ponds and the area near the Central Facilities Area are of particular interest because these areas are predicted to have elevated HI interbed I-129 concentrations now and retain concentrations near the 1 pCi/L MCL in the year 2095.

The aerial extent of contamination in the year 2095 was very sensitive to permeability in both the rediscretized and RI/BRA models. This indicates that interbed permeability on a field scale at several locations is needed to verify the RI/BRA model's homogeneous 4 mD HI interbed permeability. HI interbed permeability investigations should not be limited to evaluation of retrieved cores because hydrological properties of INEEL core rarely represent INEEL conditions on a field scale. The most useful HI interbed permeability measurements would be obtained from a straddle packer type pumping test of the in situ HI interbed.

Additional interbed elevation and thickness data are also needed. However, it may not be practical or feasible to gather enough data to adequately describe the HI interbed elevation and thickness with statistical confidence because of the variability of the data and the large area of interest.

3.3.4 Modeling Path Forward

The discretization and the HI interbed permeability sensitivity analyses suggest the RI/BRA model was conservative in predicting persistent high I-129 concentrations in the HI interbed. Review of HI interbed permeability data indicates the simulated value should be 40 mD, and the permeability sensitivity analysis indicate areal extent of contamination in the year 2095 decreases with increasing permeability. However, before predictive simulations can be performed using the rediscretized model, the model must be calibrated to aquifer head and aquifer transport data. Both the OU 3-13 RI/BRA and the rediscretized flow models relied on the WAG-10 (McCarthy et. al. 1994) flow model calibration. A multitude of new wells have been drilled since the WAG-10 modeling, and the recent work by Smith (2000)[a] has provided an improved understanding of groundwater flow direction and active aquifer thickness in the vicinity of the INEEL. A comprehensive well head data set and the flow path work by Smith (2000)[a] should be incorporated into a flow model calibration effort. The CPP-03 injection well tritium disposal data still provide a good calibration data set and should be used along with the data gathered from the OU 3-13 Group 5 field investigation to recalibrate the updated flow and transport model.

a. Dr. Richard P. Smith, BBWI Geosciences Research (Department 4122), Technical presentation, INEEL, June 8, 2000.

The recalibrated flow and transport model should then be used to reassess I-129 risk before any remediation work begins or remediation strategies are developed.

3.4 Plans for Minimizing Environmental and Public Impacts

One of the general purposes of the FFA/CO is to "expedite the cleanup process to the maximum extent practicable consistent with protection of human health and the environment." The parties to the FFA/CO intended that any response action selected, implemented, and completed under the agreement will be protective of human health and the environment such that remediation of releases covered by the agreement shall obviate the need for further response action.

Every effort has been made in the planning of this project to utilize well-established and available processes and guidance, and achieve compliance with CERCLA and Resource Conservation and Recovery Act (RCRA) processes. Special consideration has been given to the disposition of dangerous or emergency conditions.

If a dangerous/emergency condition is discovered that may pose "imminent and substantial endangerment to people or the environment," DOE-ID, EPA, or IDHW have the authority to stop work per FFA/CO, Section 29.

4. REMEDIAL DESIGN

This section outlines the activities that will be taken to meet the remedial action objectives and remediation goals that have been set forth in the ROD.

4.1 Plume Evaluation FSP Activities

This project is aimed at determining the actions required to meet the goal of "in 2095 and beyond, ensure that SRPA groundwater does not exceed a cumulative carcinogenic risk of 1×10^{-4}, a total hazard index of 1, or applicable State of Idaho groundwater quality standards." The plume evaluation will be carried out as a three-step process providing data to support decisions required for the contingent remedy design. Appendix A, Plume Evaluation Field Sampling Plan, details these activities.

Geophysical and chemical data will first be collected from the HI interbed through the deepening of four previously existing wells and the installation of one new well south of the INTEC. Aquifer water will then be collected and analyzed to determine whether these COC maximum concentration action levels are exceeded within portions of the aquifer.

If contaminant levels exceed the model-generated action levels, those zones exceeding the levels will be pump-tested for a period of 24 hours to determine whether they will sustain a flow rate of 0.5 gpm or higher.

If zones having COC levels above the action level yield a sustained flow rate of greater than 0.5 gpm, modeling will be conducted to determine the volume of the contamination plume exceeding the action level.

4.1.1 Drawings and Specifications

This section outlines the specifications for the collection of data required to address the remedial action DQOs. Drawings of the proposed well locations for interbed and aquifer water sampling are also shown.

4.1.1.1 Specifications. Existing wells USGS-77, USGS-111, USGS-113, and USGS-112 will be deepened by coring through the HI interbed to the first zone of high permeability in the I basalt below the HI interbed, but not to exceed 30 m (100 ft) below the interbed base. One new well will also be installed south of the these wells to provide a sampling location south of the predicted hot spot (Figure 4-1).

The HI interbed is a sedimentary unit located stratigraphically between the H and I basalt flow groups. The interbed is approximately 168 m (550 ft) below land surface at INTEC and generally slopes to the southeast. The average thickness of the unit within the study area is approximately 6 m (20 ft), but thickness ranges from 0 to 18 m (0 to 60 ft) have been observed in nearby wells.

Samples will be collected from interbed materials for chemical analysis of the COCs and for physical and geotechnical analysis. It is anticipated that three sample groups will be collected at each well location: one set of all chemical and geophysical parameters samples from the top; one from the middle of the HI interbed, and one from the bottom of the HI interbed. If zones that have unique hydrogeologic characteristics are encountered in the HI interbed, additional samples will be taken from the HI interbed, if possible.

The four wells extended by coring and three existing wells will undergo geophysical and fluid logging in order to determine appropriate straddle packer zones for water sampling. Approximately 10 zones will be selected above, within, and below the HI interbed in each of the aquifer monitoring wells. Water sampling will then be conducted on the selected zones and the samples will be analyzed for identified COCs.

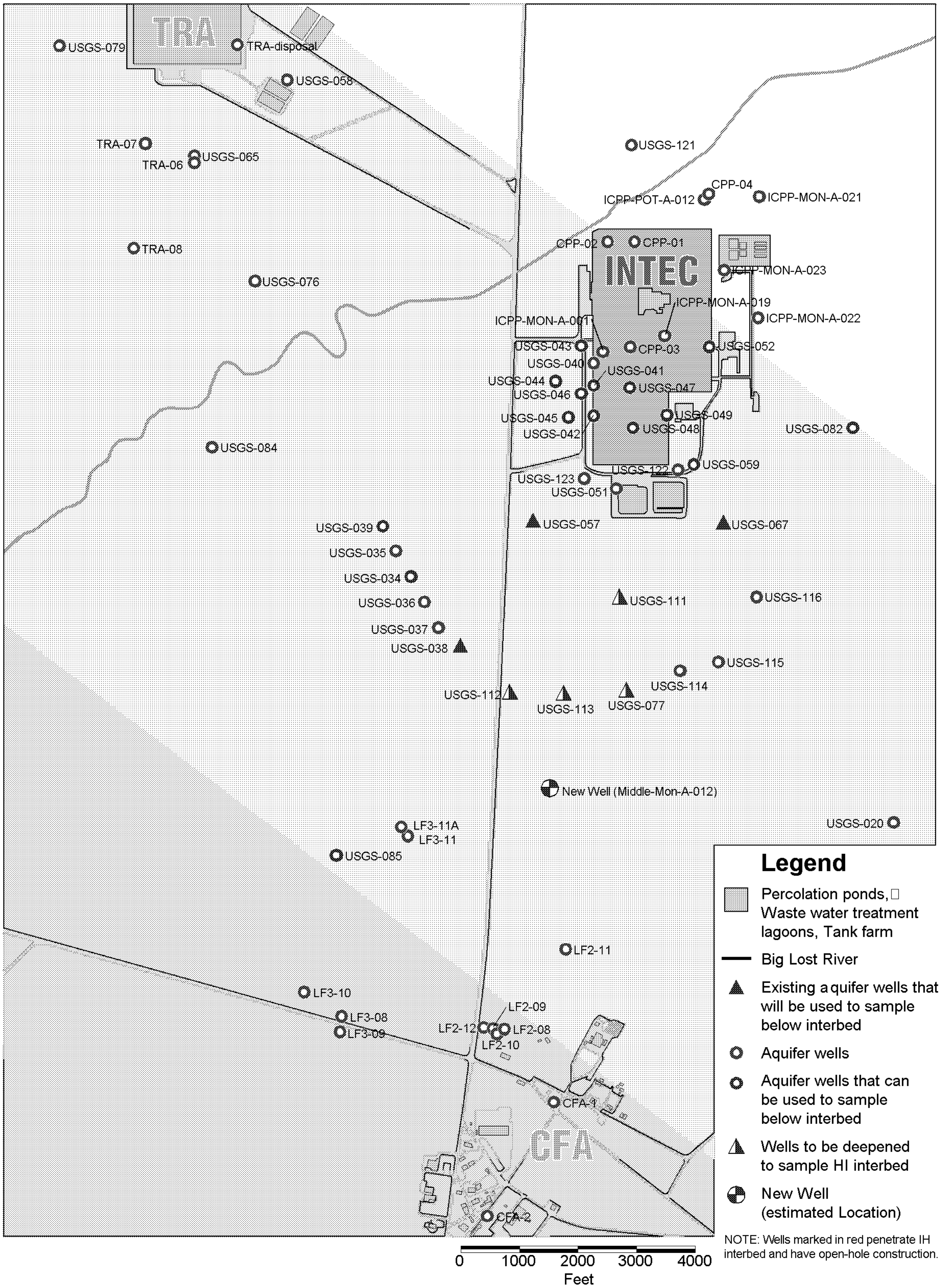

Figure 4-1. Location of monitoring wells to be deepened to sample HI interbed and location of new well.

At locations USGS-112, USGS-113, and USGS-57, a total of four groundwater samples will be collected and analyzed for Tc-99 and I-129 from the HI interbed zone during the vertical profile sampling. At locations USGS-111, USGS-67, USGS-38, USGS-77, and the new well, a sample and one replicate sample will be collected from the HI interbed. The I-129 sample and the Tc-99 sample and Tc-99 replicate will be analyzed. The replicate I-129 samples will be analyzed if the Tc-99 replicate samples show significant statistical variability or the I-129 is above the action level.

The statistical evaluation of the Tc-99 replicates will follow data validation guidelines in TPR-80 for duplicate samples. The mean difference will be calculated and, if it is less than or equal to 3, then the results are considered acceptable. The mean difference is calculated from:

$$MD = \frac{|S - D|}{\sqrt{(\sigma_s^2 + \sigma_D^2)}}$$

Where

MD= the mean difference of the duplicate results

S = the original sample result (as pCi/g or pCi/L).

D = the duplicate sample result (as pCi/g or pCi/L).

σ_s = the associated total propagated 1σ uncertainty of the original result (as standard deviation).

σ_D = the associated total propagated 1σ uncertainty of the duplicate result (as a standard deviation).

A MD value of approximately 3 indicates that the results agree at the 3σ confidence interval and an MD value of 1 indicates that the results agree at the 1σ confidence interval. If the MD >3, the relative percent difference (RPD) will be calculated and, if the result is less than 20%, then the samples will be considered to be in agreement. The RPD is defined as:

$$RPD = \frac{\text{high result} - \text{low result}}{\text{average result}} \times 100$$

If any zones exceed the model-generated action levels, they will be isolated with a straddle packer assembly and pump-tested for a 24-hour period at a discharge rate of 0.5 gpm. Discharge water samples will be collected during the pump test at 4-hour intervals and analyzed for identified COCs.

Modeling will be conducted to determine the volume of any zones that exceed the COC action level and are capable of producing a sustained yield of 0.5 gpm over a 24-hour period.

4.1.1.2 Drawings and Schematics. This section shows proposed sampling well locations, construction, and the types of samples for data acquisition.

Well Locations—Four existing wells— USGS-77, USGS-111, USGS-113, and USGS-112—will be deepened to sample the HI interbed. Water samples will be collected from these four wells in addition to wells USGS-38, USGS-57, and USGS-67. Using three other preexisting monitoring wells will assist in determining the lateral extent of the aquifer COC concentrations. These wells are shown in Figure 4-1.

Well Construction/Instrument Diagrams. Existing wells, one new well, or extended existing wells with open borehole bottom zones will be used for sampling. A schematic showing packer installation and sampling is depicted in Figure 4-2.

Chemical and Geotechnical Data—The type and number of individual samples to be collected from each well are listed in Table 4-1. The actual number collected may vary based on field conditions that are encountered.

4.2 Long-Term Monitoring Activities

The long-term monitoring activities for WAG 3, OU 3-13, Group 5 will consist of groundwater-level monitoring and groundwater sampling. This will be performed as described in Appendix B, Long-Term Monitoring Plan, to determine if the COC flux entering the SRPA from inside the INTEC security fence and the COC concentrations downgradient of the INTEC facility will cause the groundwater to exceed Idaho water quality standards in the year 2095.

4.2.1 Drawings and Specifications

This section outlines the specifications for the information that will be used to show whether the RAOs have been meet.

4.2.1.1 Specifications. This section covers the methods and materials that will be used in the successful completion of the long-term monitoring activities. Three tasks will be used to determine if the RAO objectives will be met: (1) groundwater sampling, (2) water level monitoring, and (3) comparison of field data with, and updating the predictions of, the aquifer numerical model.

Groundwater samples will be collected from 47 wells in the INTEC area to provide a baseline of the present state of COC concentration in the aquifer. Following the baseline sampling, long-term monitoring will continue using 20 wells. The long-term monitoring wells include 11 wells within or near the INTEC security fence, three wells to monitor below the HI interbed near the injection well and six wells in the plume downgradient of INTEC, depending on the results, for a period that may be as long as the institutional control period. Tables 4-2 and 4-3 list the wells to be used for the baseline and follow-on groundwater monitoring.

Groundwater elevation monitoring will be performed on a monthly basis for 1 year, followed by quarterly measurements during the second year, semiannually for 2 years, and annually thereafter until it is determined that the RAOs have been met. Table 4-4 lists the wells to be used for the groundwater elevation monitoring.

Approximately 20 wells will be sampled by the micropurge method during the semi-annual sampling event. The micropurge pumps will be placed at the same depth as the pumps that are currently in the wells. The current pump depths were evaluated by the USGS and the depth selection was based on borehole fluid and geophysical logging. The pumps were placed in zones of high transmissivity. The goals of the micropurge sampling are to get data that is comparable to historical data collected from the wells and to reduce the amount of purge water generated during sampling.

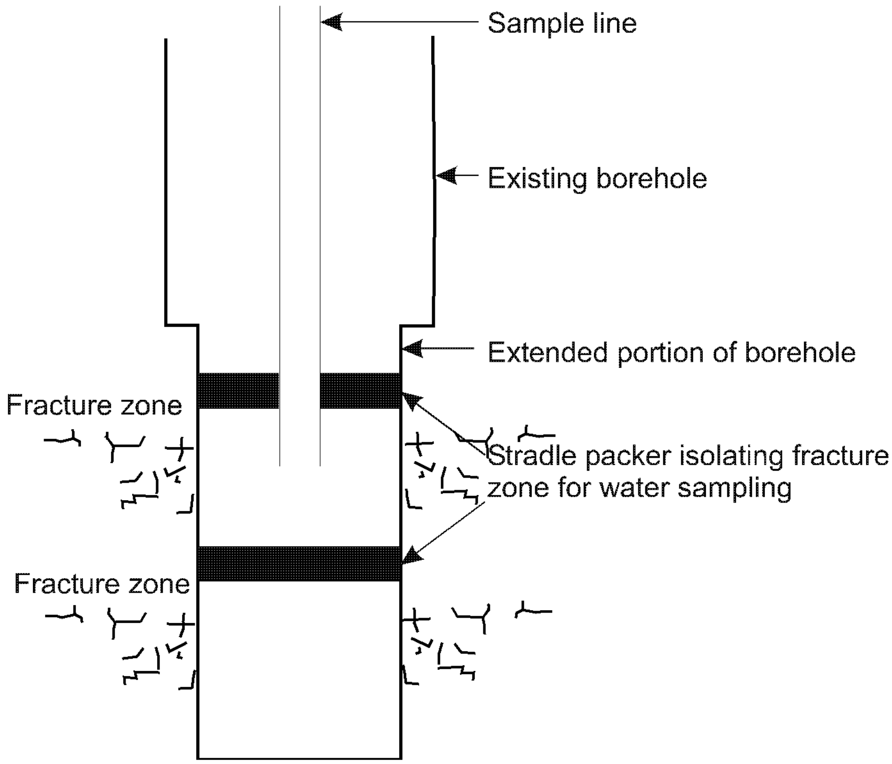

Figure 4-2. Conceptual diagram for straddle-packer sampling.

Table 4-1. Type and number of samples collected.

Analysis	Matrix	USGS -38	USGS -57	USGS -67	USGS -77	USGS -111	USGS -113	USGS -112	Middle MON-A-012
H-3	Water	10	10	10	10	10	10	10	10
Sr-90	Water	10	10	10	10	10	10	10	10
I-129	Water	10	10	10	10	10	10	10	10
H-3	Interbed	0	0	0	3	3	3	3	3
Sr-90	Interbed	0	0	0	3	3	3	3	3
I-129	Interbed	0	0	0	3	3	3	3	3
Grain size	Interbed	0	0	0	3	3	3	3	3
Porosity	Interbed	0	0	0	3	3	3	3	3
Bulk density	Interbed	0	0	0	3	3	3	3	3
Hydraulic conductivity	Interbed	0	0	0	3	3	3	3	3

Table 4-2. Baseline groundwater sampling wells.

INEEL Name			
ICPP-MON-A-021	USGS-34	USGS-46	USGS-85
ICPP-MON-A-022	USGS-35	USGS-47	USGS-111
LF2-08	USGS-36	USGS-48	USGS-112
LF2-09	USGS-37	USGS-49	USGS-113
LF2-10	USGS-38	USGS-51	USGS-114
LF2-11	USGS-39	USGS-52	USGS-115
LF2-12	USGS-40	USGS-57	USGS-116
LF3-08	USGS-41	USGS-59	USGS-121
LF3-09	USGS-42	USGS-67	USGS-122
LF3-10	USGS-43	USGS-77	USGS-123
LF3-11	USGS-44	USGS-82	MW-18
USGS-20	USGS-45	USGS-84	

Table 4-3. Long-term groundwater monitoring wells.

INEEL Name		
USGS-40	USGS-52	USGS-57
USGS-41 (sampled below HI interbed)	USGS-59 (sampled below HI interbed)	USGS-67
USGS-42	USGS-121	USGS-85
USGS-47	USGS-122	USGS-112
USGS-48	USGS-123	LF3-08
USGS-48 (sampled below HI interbed)	MW-18	
USGS-49	USGS-113	
USGS-51		

Table 4-4. Wells for water-level monitoring.

INEEL Name				
ICPP-MON-A-021	LF3-11	USGS-42	USGS-57	USGS-112
ICPP-MON-A-022	USGS-20	USGS-43	USGS-59	USGS-113
LF2-08	USGS-34	USGS-44	USGS-65	USGS-114
LF2-09	USGS-35	USGS-45	USGS-67	USGS-115
LF2-10	USGS-36	USGS-46	USGS-76	USGS-116
LF2-11	USGS-37	USGS-47	USGS-77	USGS-121
LF2-12	USGS-38	USGS-48	USGS-82	USGS-122
LF3-08	USGS-39	USGS-49	USGS-84	USGS-123
LF3-09	USGS-40	USGS-51	USGS-85	MW-18
LF3-10	USGS-41	USGS-52	USGS-111	TRA-08

4.2.1.2 Drawings. Maps showing the well locations for the long-term monitoring are included below. Figure 4-3 shows the locations for the baseline groundwater monitoring wells, and locations of the monitoring wells to be used for groundwater elevation monitoring Figures 4-4 and 4-5 show the well locations for the long-term monitoring.

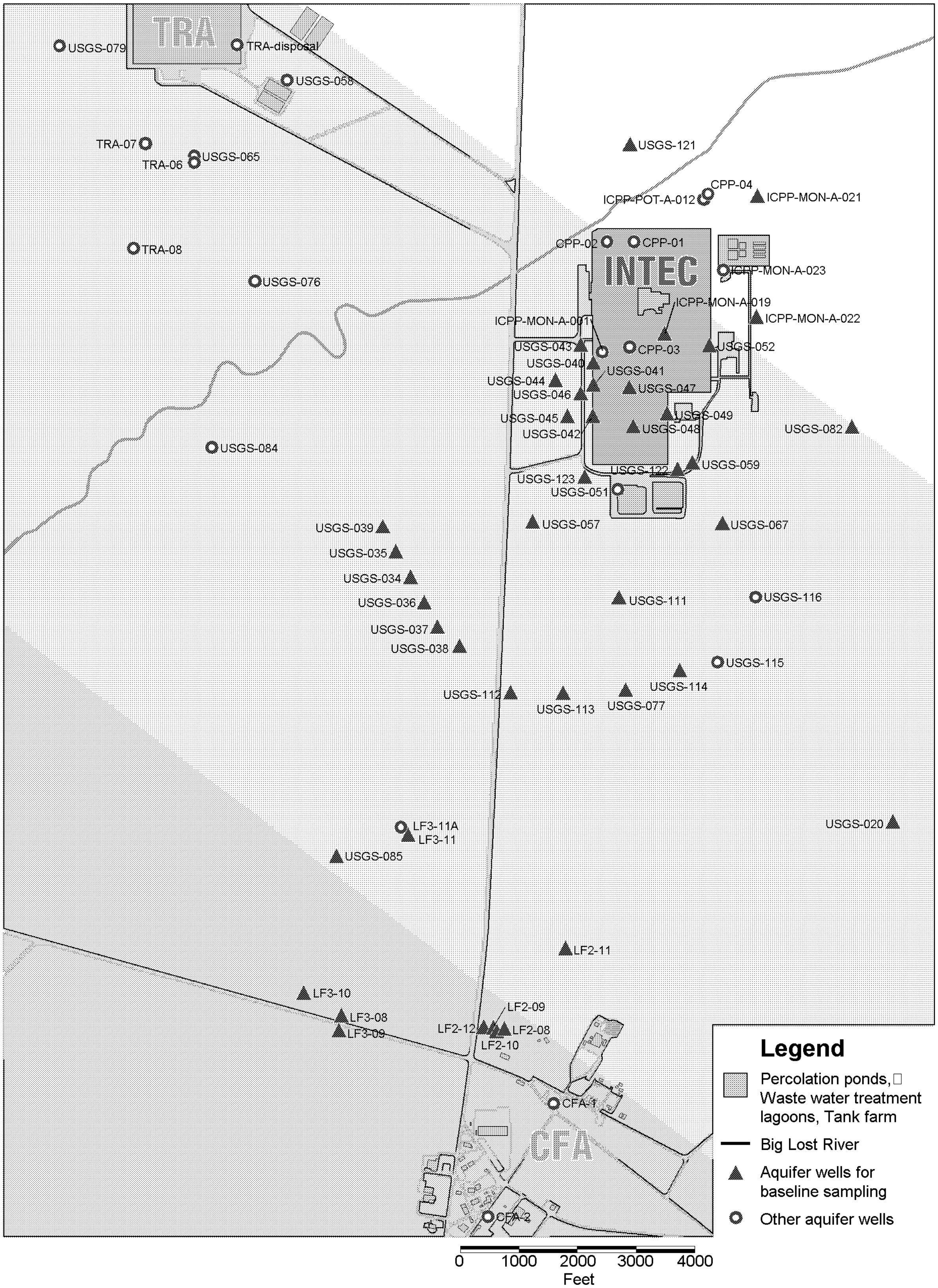

Figure 4-3. INTEC groundwater wells for baseline sampling and water-level measurement.

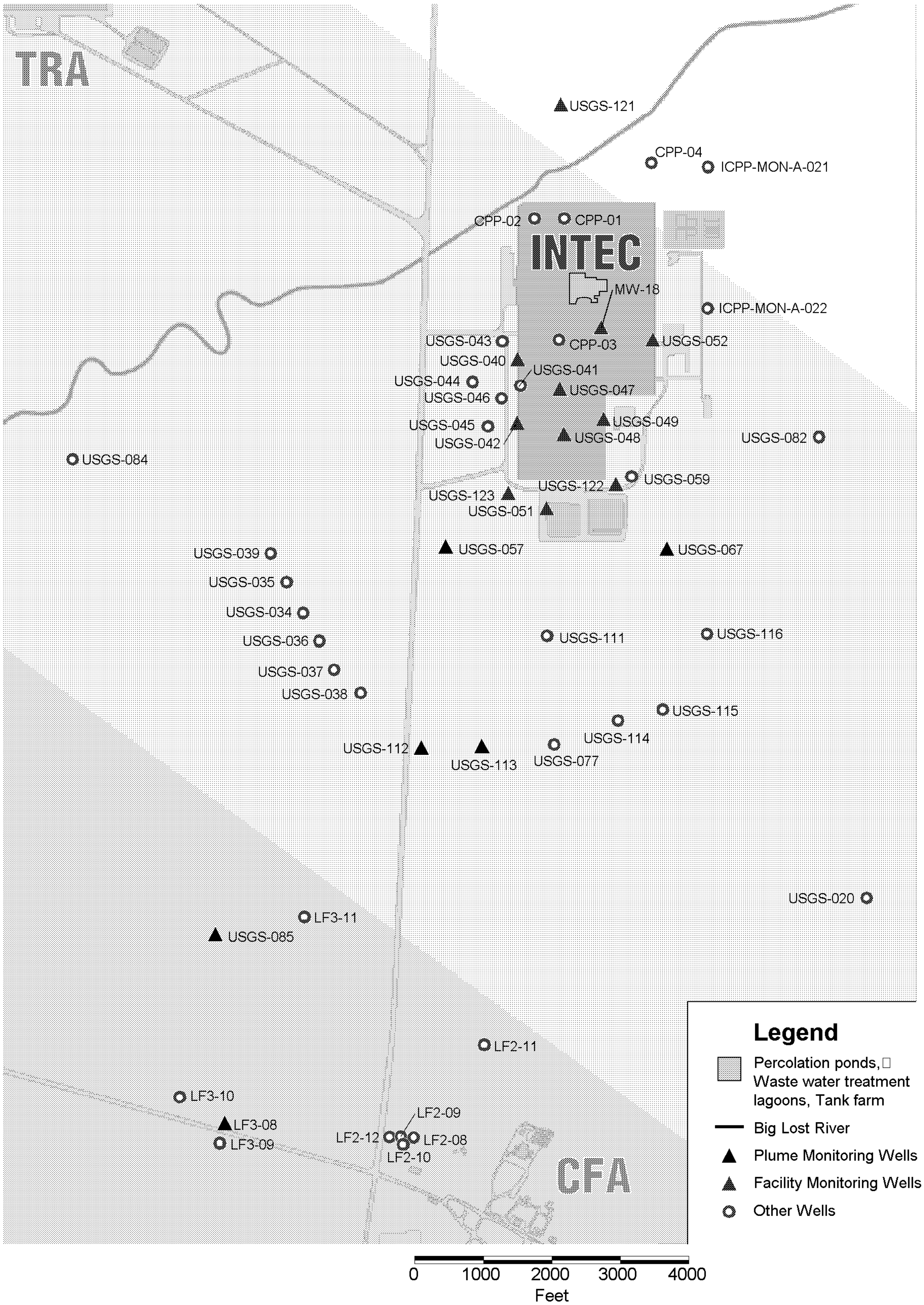

Figure 4-4. INTEC groundwater wells for long-term monitoring.

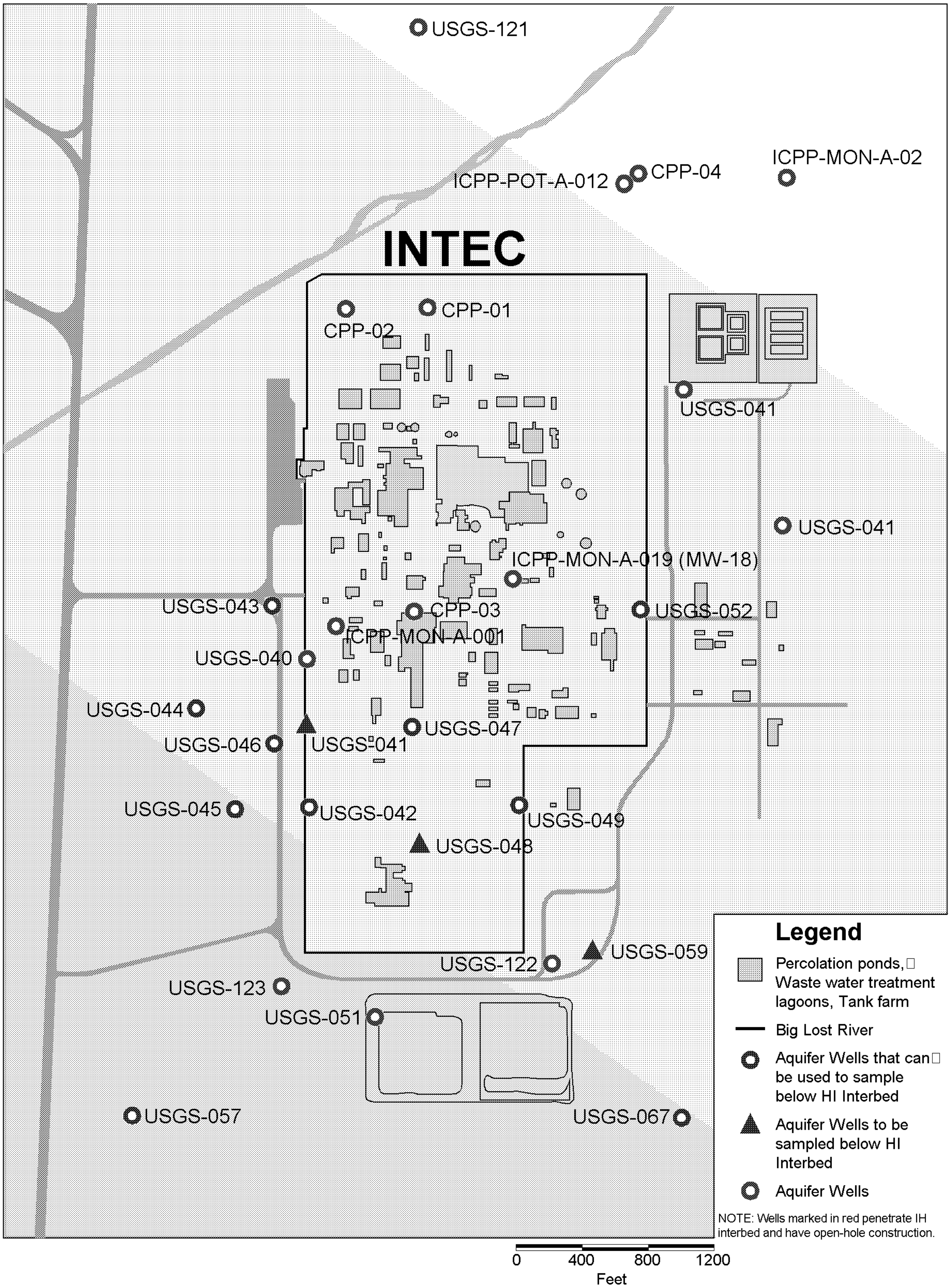

Figure 4-5. INTEC groundwater wells for long-term monitoring of the COC flux from the former injection well below HI interbed.

5. REMEDIAL ACTION WORK PLAN

5.1 Relevant Changes to the RD/RA SOW

The RD/RA SOW for WAG 3, OU 3-13 (DOE-ID 2000a) presents a SOW for Group 5 that consists of

- Reevaluation of the SRPA model in order to identify the potential hot spot(s) for the COCs .
- The drilling of one new well and deepening of four existing wells within the area of the identified COC concentration.
- The sampling and analysis of water samples from those wells.
- Depending upon the results of the sampling, conducting 24-hour pump tests on the wells where the COCs exceed proscribed action levels.
- If the pump test(s) indicates that well production is equal to or greater than 0.5 gpm during the 24-hour test period, treatability studies will be performed.

The modeling evaluation indicates that within the modeled hot spot there are existing wells, completed as open holes. These wells will be advanced to the HI interbed in order to eliminate the need for the drilling of new wells, saving a substantial cost.

The decision to utilize existing wells instead of drilling new wells represents the only departure from the SOW outlined in the OU 3-13 RD/RA SOW document.

5.2 Subcontracting Plan

The work elements comprising this RA consist primarily of well drilling and the monitoring, sampling, and analysis of the wells.

The major portion of this work is planned to be competitively bid and awarded to the lowest qualified bidder. The BBWI procurement process will be followed and will include, but is not limited to, issuance of a request for proposal (RFP), prebid conference, bid evaluation, notice of award, notice to proceed, vendor data submittals, and preconstruction kick-off meeting.

The work elements described in this work plan may be performed under a single subcontract or several subcontracts. Site force personnel may perform a portion of this work, if necessary. Both subcontract and site personnel will be required to perform to the schedule outlined in Section 5.7 of this document in order to meet the overall project schedule and objectives.

5.3 Remedial Action Work Elements

This section provides an overview of the 10 major elements of the remedial action work plan.

5.3.1 Premobilization

Premobilization efforts involve all work elements that must be completed before the drilling contractor arrives on the site to start work. This includes such work as securing a contract for drilling services, surveying proposed locations, marking proposed locations for underground utilities, and completion and approval of work control packages. The final premobilization effort is a formal pre-job meeting at which the scope of work is discussed and health and safety plan (HASP) training is conducted. Any outstanding questions about the work to be performed are resolved at this meeting.

5.3.2 Mobilization

Once the pre-job meeting has been completed, the drilling contractor will be free to begin mobilization of the equipment to the site. Mobilization of equipment consists of physically locating all drilling and ancillary equipment to the site and setting up on the first hole to be drilled.

5.3.3 HI Interbed Hot Spot Drilling

The deepening of the four existing aquifer monitoring wells and the addition of one new well will be completed under a competitively bid and awarded subcontract. The BBWI procurement process will be followed and will include, but may not be limited to, the issuance of an RFP, prebid conference, bid evaluation, notice of award, notice to proceed, vendor data submittals, and preconstruction kick-off meeting.

A trained geologist, supported by the area construction engineer, will observe the well drilling activities to log the borehole and well construction and ensure that the work meets the contract requirements.

Other work elements included in this task, such as nondrilling field work, may be performed by BBWI personnel or performed under other subcontracts.

5.3.4 Vertical Sampling

Borehole geophysical and fluid logging will be performed by BBWI or USGS personnel.

Collection of interbed materials and aquifer water samples will be conducted by INEEL personnel. A subcontract laboratory will perform analysis of the samples. Coordination of the laboratory contracting and data management (as shown in Appendix D, Data Management Plan) will be performed by the INEEL Sample Management Organization.

5.3.5 24-Hour Pumping and Sampling

If needed, any 24-hour pumping tests and any other sampling or work elements included in this task, may be performed by BBWI personnel or performed under other subcontracts. A subcontract laboratory will perform analysis of the samples collected during the pump test. Coordination of the laboratory contracting and data management will be performed by the INEEL Sample Management Organization.

5.3.6 Demobilization

When all drilling has been completed and instrumentation has been placed, the contractor will begin demobilization of the equipment. Demobilization includes the physical removal of all equipment from the site, restoration of disturbed areas, and general clean up of all work areas. When demobilization is completed, the work areas should be as close to original condition as possible.

5.3.7 Baseline Sampling

Forty-seven existing INTEC aquifer wells will be sampled by INEEL personnel at the onset of the Group 5 monitoring. The choice of a laboratory to perform the sample analysis has yet to be made.

Coordination of the laboratory contracting and data management will be performed by the INEEL Sample Management Organization.

5.3.8 Micropurge Sampling

During the semiannual groundwater sampling event, groundwater samples will be collected using both the high flow (15 – 25 gpm) pumps currently in the wells and using a micropurge method that pumps at approximately 1 gpm at approximately 20 wells. The data from both methods will be evaluated to determine if the data sets are statistically equivalent. If the micropurge data are determined to be equivalent to the standard method data, subsequent groundwater samples will be collected by the micropurge method. Adopting the mircopurge method will substantially reduce the amount of wastewater generated during sampling and significantly reduce the costs associated with the monitoring program.

5.3.9 INTEC Facility Monitoring

Eleven existing INTEC aquifer wells will be sampled by INEEL personnel to evaluate if the RAOs will be met. In addition, three wells will be sampled below the HI interbed to evaluate the former INTEC injection well. The choice of a laboratory to perform the sample analysis has yet to be made. Coordination of the laboratory contracting and data management will be performed by the INEEL Sample Management Organization.

5.3.10 Long-Term Monitoring of the Plume Outside the INTEC Fence

Six wells have been selected for long-term monitoring of the INTEC plume beyond the INTEC security fence. The location and number of wells used for long-term monitoring are contingent upon the results of the baseline groundwater sampling and the plume evaluation results (that is, the contamination within, or below, the HI interbed). The choice of a laboratory to perform the sample analysis has not yet been made. Coordination of the laboratory contracting and data management will be performed by the INEEL Sample Management Organization.

5.4 Evaluation of Remedial Action Against Performance Measurement Points

Under Group 5, there are two potential sources of contamination that may prevent meeting the SRPA RAOs. The first source is a model-predicted hot spot of I-129, Sr-90, and H-3 that may exist in the HI sedimentary interbed south of INTEC. This predicted hot spot resides within the current boundary of Group 5. The potential existence of this hot spot is the driver for the Plume Evaluation FSP (see Appendix A) presented as part of this MSIP. The second potential source of contamination to Group 5 that may prevent meeting the SRPA RAOs is the flux of contaminants into Group 5 from vadose zone and aquifer contamination present inside the INTEC security fences. The Group 4 remedial actions and OU 3-14 RI/FS are designed to address remediation of this contamination. However, the flux of contaminants migrating from beneath the INTEC facility and the long-term monitoring of the INTEC groundwater plume outside of the INTEC fence are the drivers for the Group 5 LTMP included in this MSIP.

Both of these potential sources of contamination, and the monitoring/remedial actions performed to address them, will be evaluated against the same RAO of preventing COC concentrations from exceeding MCLs in 2095, though the method of evaluation is different between the two sources of contamination.

5.4.1 Evaluation of HI Interbed Testing

The results of the HI interbed testing will be evaluated using the evaluation steps that have been generally defined in the ROD (ROD, Figure 11-6, pages 11-27) and the project flow chart (Figure 2-1 in this report). This evaluation consists of first determining whether there exist zones of groundwater contamination within the model-predicted hot spot, where COC concentrations exceed an action level above which the COC concentration is predicted to continue to exceed MCLs in 2095 and beyond. If no zones exceeding this action level are identified, then the plume evaluation is completed and no risk is assumed to exist from this potential source of contamination.

If a zone(s) is found that exceeds the COC action level, then additional testing in the form of a 24-hour pump test and sampling will be performed to evaluate whether the zone exceeding the action level has a potential groundwater production capacity to supply a hypothetical residential groundwater user. Again, if the production capacity of the zone(s) is not sufficient to meet the residential user minimum requirement of 0.5 gpm for 24-hr plume evaluation is completed and no risk is assumed to exist from this potential source of contamination.

Finally, if the contaminated zone(s) exceeding COC action levels is capable of producing at least 0.5 gpm for 24 hours, then the volume of this hot spot will be assessed through the creation of isopleth maps. The volume of the hot spot will be evaluated either through numerical modeling or analytical methods to determine if the hypothetical groundwater user could pump from the hot spot for at least 1 year. If the hot spot is determined to be too small in volume to sustain the groundwater user for 1 year, then the plume evaluation is completed and no risk, or an acceptable risk, is assumed to exist from this potential source of contamination. If the zone is sufficient to sustain the groundwater user for more than 1 year, contingent remedial actions are required. The project will proceed as shown in the project flow path on Figure 2-1.

5.4.2 Evaluation of Long-Term Monitoring Results

The data obtained under the LTMP will be evaluated and incorporated into a refined WAG 3 numerical model to determine the flux of contaminants to the SRPA outside the INTEC security fence and to determine if WAG 3 RA will result in meeting the COC concentration limits at the INTEC security fence in 2095. As discussed above, this numerical modeling task will incorporate the results of the long-term monitoring results, as well as data from other sources including the Group 4 monitoring activities, OU 3-14 tank farm RI/FS results, and other sources that may become available. This combined evaluation will be performed for both Groups 4 and 5, which share a common RAO of preventing COC concentrations in the SRPA from exceeding MCLs in 2095 and beyond, outside the INTEC security fence. This evaluation will be performed as part of the CERCLA 5-year review process as well as at specific points within the Group 4 RA schedule.

The process to develop the numerical simulation of the long-term monitoring data is summarized as follows:

1. Refine the existing conceptual model describing the physical and chemical processes that will be represented in the numerical model.

2. Refine the existing parameterization of the model that meets the conceptual model assumptions. The OU 3-13 RI/FS model parameterization will be the primary source for this initial parameterization.

3. Calibrate the model. The calibration will consist of adjusting parameter values to improve model agreement to the field data.

4. Summarize the sensitivity and uncertainty analysis and how the results will be used. The sensitivity and uncertainty analysis will evaluate the model structure to determine which attributes of the subsurface model have the largest effect on predicted peak concentrations in the aquifer.

5. Summarize the predictive model results and COC concentration predictions at the performance measurement point in 2095.

5.5 Composite Analysis

As part of the CERCLA cumulative risk evaluation, the composite analysis of risks via the groundwater pathway from all sources at INTEC will be updated. As new sites are identified, additional information is obtained about existing sites and various sites are removed or capped, the WAG 3 aquifer model will be updated to account for the change in source terms. To develop an integrated strategy and schedule for updating the model, the following steps, illustrated in Figure 5-1, will be performed:

1. Compile all WAG 3 and INTEC groundwater data collection, modeling activities, and decisions into one integrated schedule (groundwater monitoring requirements and data evaluations for other programs are outside the scope of the OU 3-13 RA)

2. Update all the pieces into one model that incorporates new data on Big Lost, HI interbed, and K_d (box 1 in Figure 5-1)

3. Add in all the high-level waste (HLW) sources from the EIS (DOE 1999), using the scenario selected in the HLW&FD ROD (box 2)

4. Add in (or confirm) all CERCLA sources from OU 3-13 and OU 3-14 (box 2)

5. Update with any newly identified sources from historical releases, as described on the New Site Inclusion Forms (box 2).

When the composite analysis has been performed, including all known sources, the updated model can be used to determine the allowable incremental risk that can be added (box 4). Then the impact of any given pending facility closure on the aquifer can be evaluated (box 5). If the additional source from the closure causes a calculated exceedance of the allowable risk threshold (box 7), then the closure plans can be modified as necessary to ensure that the RAOs for the aquifer are not exceeded in terms of either risk or MCL (boxes 6 and 8). This RA does not have the authority to delay or redesign closures that are bound by schedules under other regulatory programs or legal agreements.

The total maximum allowable risk from groundwater ingestion resulting from sources at INTEC was set in the OU 3-13 ROD at 1E-4 excess cancer risks, or 1 in 10,000 by the year 2095. The second RAO is that MCLs can not be exceeded in the aquifer after the year 2095.

5.5.1 Modeling

The WAG 3 composite analysis focus is long-term, steady-state model. The model will be run for the period from 2005 to 10,000 years. The intent of the composite analysis modeling is to support long-term decisions, such as facility disposition and closures.

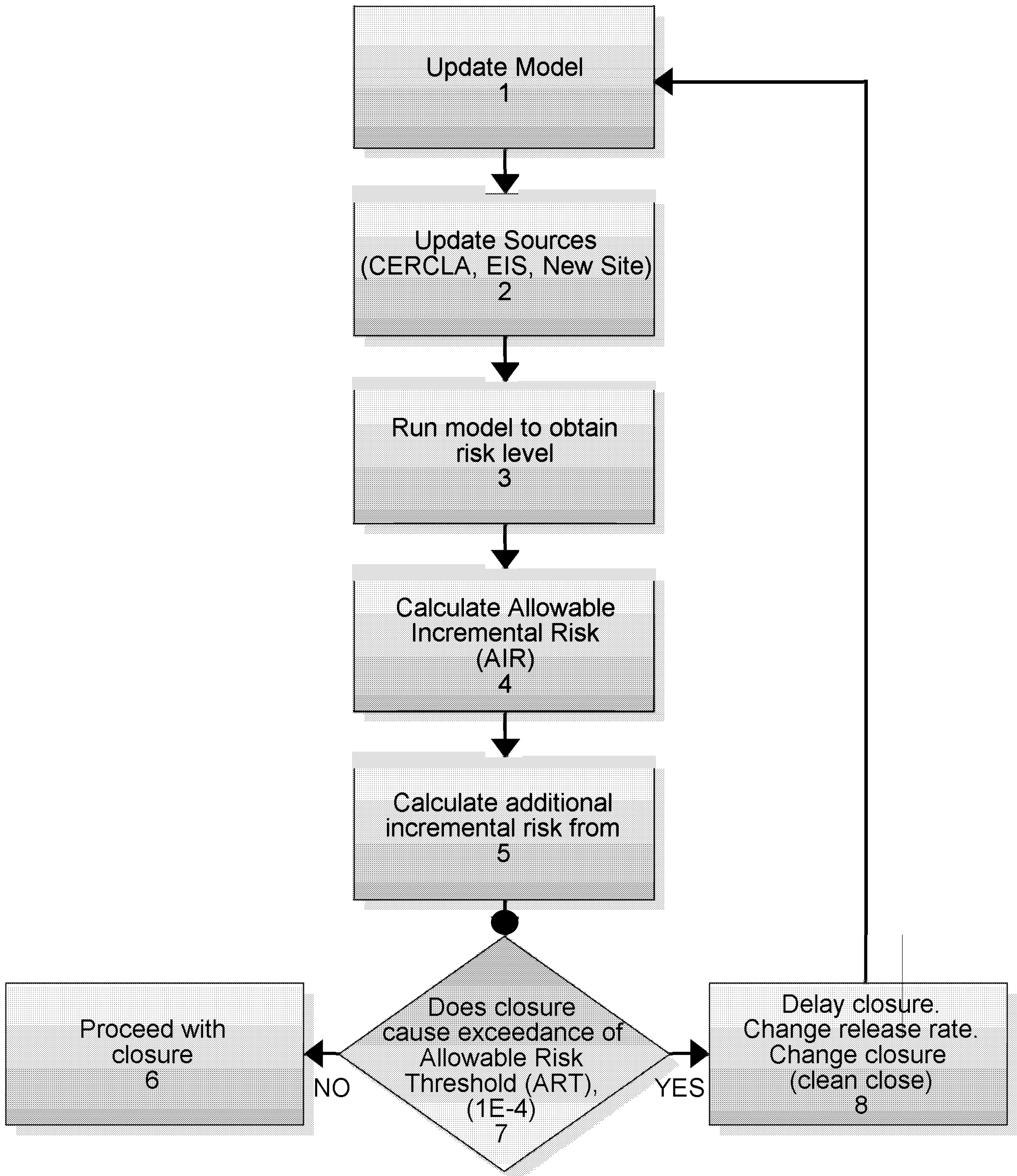

Figure 5-1. Flow chart for composite analysis.

The modeling focus for WAG 3 Groups 4 and 5 is initially non-steady-state modeling using calibration to new data from 2000-2095 to determine whether modeling predictions agree with empirical data. When the model for Group 5 can match more recent data (from 2000, 2001), it will be determined whether exceeded in the aquifer outside INTEC (DOE-ID 1999) after 2095. These data-gathering and modeling efforts directly support the contingent remedial action decisions established in the OU 3-13 ROD. Information that will be gathered to update the WAG 3 model of the vadose zone and the aquifer for the composite analysis is listed and discussed below.

5.5.2 Hydrologic and Recharge Issues

The Group 4 data collection will

- Determine whether drain-out of the perched water related to relocation of the percolation ponds is occurring as predicted
- Define the contribution of the Big Lost River recharge to the vadose zone
- Predict the final "steady state" of the vadose zone once the drain-out period from the percolation pond relocation is over.

The Group 5 data collection will initially focus on confirming the model predictions for the concentrations of contaminants in the HI interbed. Group 5 data collection will also support the evaluation of flux from inside INTEC security fence into Group 5.

The OU 3-14 RI will include determination of the nature and extent of the contaminated soils at the tank farm. The RI will also investigate moisture transport through the tank farms soils, and the model will be updated to incorporate this data.

5.5.3 Other Source Issues

The OU 3-13 model showed that leaching and transport of contaminants from tank farm soils posed a future risk from Sr-90, Pu-238, Pu-239, Pu-240, and I-129. The risk after year 2095, based on modeling predictions, was from plutonium contamination of the tank farm soils and from I-129 trapped in the HI interbed, combined with minor I-129 contribution from surface sources, which was hydraulically driven by continuous recharge of perched water from the percolation ponds.

The OU 3-14 source update will include a source term refinement based on tank farm field data. The tank farm soils are the major source of contaminants at INTEC. This investigation will also obtain partition coefficients (K_ds) for some contaminants in the surficial soils, which is the long-term risk driver for groundwater ingestion from the tank farm soils. The data obtained will allow for the WAG 3 model to be updated with a more accurate mass loading of contaminants from the tank farm soils.

The OU 3-14 RI will also refine the secondary source at the injection well. The OU 3-13 model showed that I-129 from the injection well would exceed the MCL after 2095. Most of this was due to "hold up" of the I-129 in the HI interbed. The Group 5 update of the HI interbed portion of the aquifer model may change this prediction.

The HLW& FD EIS model screened out plutonium as a contaminant to the aquifer from the High Level Waste Tank Heels, on the basis that plutonium would either be separated out from the waste or would be bound up in high K_d grout. Even though the grout is assumed to suffer physical breakdown at 500 years, it is also assumed to maintain its chemical properties (including the high K_d for plutonium).

Sources from any newly identified historical release sites will be added into the model during the next scheduled update to the model.

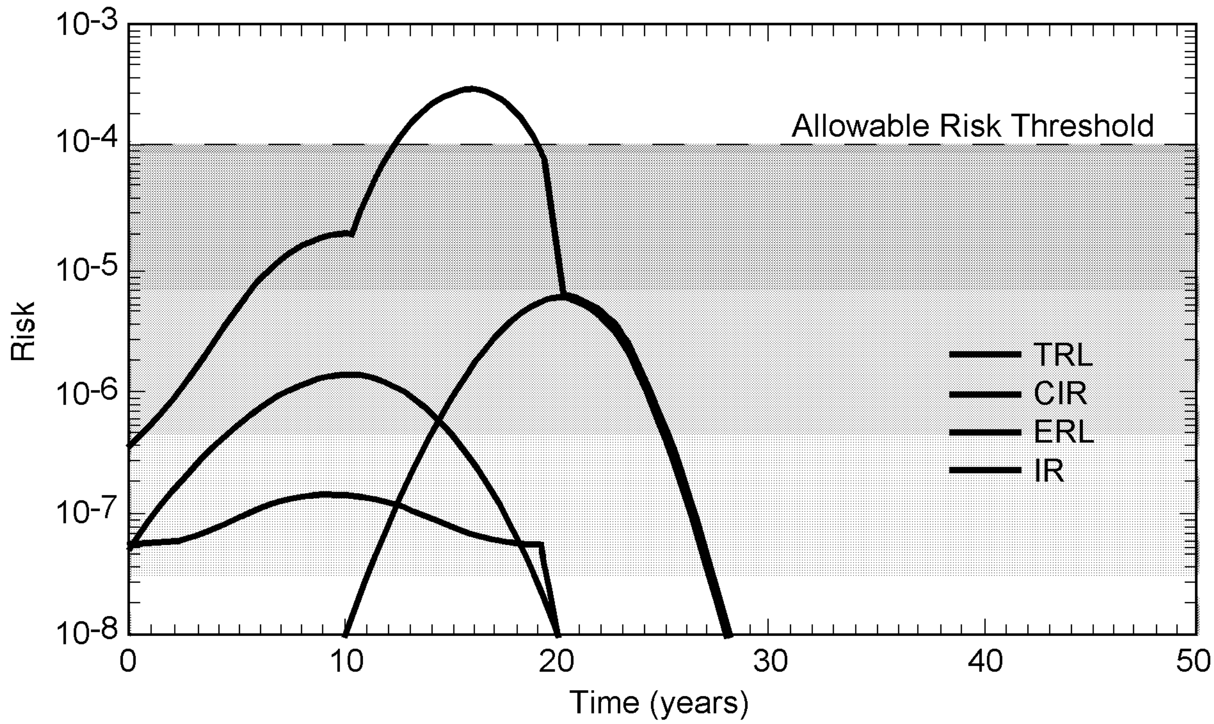

Figure 5-2. Example of the addition of all risk sources to calculate allowable incremental risk (Schafer 1998).

5.5.4 Determination of Impact of Planned Facility Closures

To determine allowable additional incremental risk (AIR) for building closures, the source terms from building closures will be evaluated for incremental impact after all the existing sources are incorporated into the model and the model has been run to establish a baseline of risk to the aquifer.

Using 1E-4 risk as the allowable risk threshold (ART), add together all known sources (CIR+HLWIR+NSIR)= TRL (see Figure 5-2). The allowable additional incremental risk (AIR) is ART-TRL. Assume that the AIR cannot all be used by one facility. If the ART is exceeded due to the new source from what will be left in place by the closure, then either the time of the release or the rate of release must be changed until the TRL is < the ART with the new source included.

5.6 Field Oversight and Construction Management

The DOE-ID remediation project manager will be responsible for notifying the EPA and IDHW of major project activities such as project startup or closeout and other project activities it deems appropriate. DOE-ID will serve as the single interface point for all routine contact between the EPA, IDHW, and BBWI, and the RD/RA contractor.

BBWI is responsible for field oversight and construction management services for this project and will provide field support for health and safety, quality assurance, and landlord services. A project organization chart and associated position descriptions are provided in the project health and safety plan (HASP), Appendix G of this report.

Visitors to the project who wish to observe remediation activities must meet badging and training requirements necessary to enter INEEL and INTEC facilities. Project-specific training requirements for visitors are described in the project HASP.

5.7 Project Cost Estimate

The detailed project cost estimate is provided in Appendix E. The costs will be revised for each submittal of the work plan to reflect new information or comments.

5.8 Project Schedule

The RA schedule for Group 5 is presented in Appendix F and includes all project tasks from preparation of this work plan through performance of the RA and submittal of the final RA report. Administrative and document preparation and field activities are based on an 8-hour day, 5-day work week. This schedule assumes concurrent contractor and DOE-ID document reviews. There is no schedule contingency for delays due to slow or late document reviews, or for field activities impacted by adverse weather conditions. Shown below are the future documents and major Group 5 activities identified on the schedule shown in Appendix F.

OU 3-13 Group 5 MSIP becomes final	11/30/00
Begin INTEC facility monitoring	3/9/01
Group 5 well drilling completed	8/9/02
First INTEC monitoring wells annual report	3/14/02
Statistical sampling 24-hour pumping report	1/21/03
Final Group 5 monitoring report decision/summary report	9/18/03
Treatability studies complete (if required)	8/6/04
First composite analysis/performance assessment report	3/22/05

5.9 Remedial Action Reporting

Section 6 of this document identifies each of the reports to be developed and submitted in compliance with RD/RA work plan reporting requirements. Reporting requirements mandate that the following reports be prepared:

- Well completion reports
- 24-hour statistical sampling pumping report (if determined to be necessary)
- Monitoring report/decision summary report—a primary document
- CERCLA 5-year review(s) and composite analysis
- Routine (annual) sampling and monitoring reports
- Treatability study(ies) final report(s) (if determined to be necessary).

5.10 Health and Safety Plan

The project HASP was prepared specifically for the tasks and conditions expected during implementation and execution of this project. The HASP, which may be updated as site and project conditions dictate, is in Appendix G, and includes the following elements:

- Task site(s) responsibilities
- Personnel training requirements
- Occupational medical program and medical surveillance
- Safe work practices
- Site control and security
- Hazard evaluation
- Personal protective equipment
- Decontamination and radiation control
- Emergency response plan for the task(s).

5.11 Field Sampling Plan

The Plume Evaluation FSP for this project, providing guidance for drilling activities, instrument installation, and collection of sampling during the OU 3-13 plume evaluation, is given as Appendix A of this document.

5.12 Waste Management

The following waste streams are expected to be generated as a result of the Group 5, SRPA remedial action activities:

- Personal protective equipment
- Decontamination wastes/water
- Purge water
- Noncontaminated project waste
- Soil and debris
- Drill cuttings.

Ultimate disposition of these wastes will depend on whether they are radionuclide-contaminated. A description of these waste streams and their appropriate disposition is provided in the project Waste Management Plan, see Appendix H.

5.13 Quality Assurance

Quality assurance and quality control for all phases of this project will be controlled by the Site-approved Quality Assurance Project Plan (QAPjP) for ER projects. The approved QAPjP for all ER projects at the INEEL is EPA-QA/R-5. The quality level designation and record for this project is provided in Appendix I of this document.

5.13.1 Quality Assurance Project Plan

The approved QAPjP for all ER projects at the INEEL is EPA-QA/R-5. Revision 6 of the QAPjP is the latest released version. The latest revision to the ER QAPjP, provided as Appendix J in this document, is based on EPA-QA/R-5 as requested by the State of Idaho and EPA Region X.

The QA objectives for measurement will meet or surpass the minimum requirements for data quality indicators established in the "Quality Assurance Project Plan for Waste Area Groups 1, 2, 3, 4, 5, 6, 7, 10 and Inactive Sites" (DOE-ID 2000b). The QAPjP provides minimum requirements for the following measurement quality indicators: precision, accuracy, representativeness, completeness, and comparability.

The detection limits described in DOE-ID 2000b meet or surpass the decision-based concentrations of the contaminants of concern with the exception of I-129. The I-129 quantitation requirements (reporting threshold) is 1 pCi/L, which necessitates a minimum detection limit (MDL) of 0.1 pCi/L to identify I-129 presence with an acceptance level of confidence. The 0.1 pCi/L MDL can be met using mass spectrometry coupled with a specialized sample introduction system to increase sensitivity (which also serves to lower detection limits). High resolution inductively coupled plasma – mass spectrometry (ICP-MS) can also meet the 0.1 pCi/L MDL. This capability is being developed in the Analytical Laboratory Department at INTEC, which would allow measurement of environmental samples directly without chemical separation. The minimum detection limits for Sr-90 and H-3 need to be at least 0.8 pCi/L and 2,000 pCi/L, respectively.

5.14 Decontamination

Upon completion of well drilling activities, exposed surfaces of equipment used for well drilling and sampling will be decontaminated at designated decontamination areas in each work zone by brushing and wiping until all visible traces of soil and soil-related staining have been removed. If all the soil/staining cannot be removed by simple brushing and wiping, decontamination solutions (e.g., water) will be used. All rags, brushes, and spent decontamination solutions will be managed per the project Waste Management Plan (see Appendix H).

5.15 Long-Term Monitoring

The project LTMP (Appendix B) identifies routine and/or periodic monitoring, sampling/analysis, inspection, and maintenance requirements to be implemented following the completion of Group 5 well drilling, 24-hour pump tests, and treatability study activities. The plan also identifies the requirements for periodic reporting and identification of end-points for long-term. Maintenance activities are expected to continue until the end of FY2095. The LTMP may be revised as necessary to incorporate changes and additions identified during the implementation of the plan.

5.16 Spill Prevention/Response Program

Any inadvertent spill or release of potentially hazardous materials (i.e., equipment fluids) will be subject to the substantive requirements contained in the INEEL Emergency Plan/RCRA Contingency Plan Implementing Procedures manual (PLN-114-2).

Handling of the material and/or substance shall be in accordance with the recommendations of the applicable material safety data sheets, which will be located at the project site(s). In the event of a spill, the emergency response plan outlined in the project HASP will be activated. All materials/substances at the work site shall be stored in accordance with applicable regulations in approved containers.

5.17 Other Procedures Relevant to RA Activities

Appendix L identifies additional documents that are relevant to RA activities at the INTEC.

5.18 Storm Water Pollution Prevention Plan

The INEEL must comply with the National Pollutant Discharge Elimination System (40 CFR 122), *General Permit for Storm Water Discharges from Construction Activities,* issued February 17, 1998, by EPA. The General Permit requires a storm water pollution prevention plan for construction activities. The INEEL generic plan and the project-specific plan are provided in Appendix M.

6. REPORTING

Compliance with Group 5 requirements will necessitate the development of several reports for this project. A brief discussion of each is provided below.

6.1 Well Completion Reports

This report, prepared following drilling activities, will include construction diagrams and detail the construction and completion of each well drilled.

6.2 Twenty-Four-Hour Pump Test and Sampling Report

This report will document the results of the 24-hour pump tests that are required on wells when initial sampling activities indicate that COCs concentrations exceed action levels. This report will be prepared only if 24-hour pumping tests are determined necessary.

6.3 Monitoring Report/Decision Summary

This report, a primary document, will be produced following the drilling of the new wells, their sampling and analysis, and 24-hour pump tests if required. The report will include the 24-hour pump test and sampling report and document the results of well monitoring/sampling activities and provide the justification for the decision concerning the need for treatability studies and contingent remedial action. An updated operations and maintenance plan will be included as a part of this report. This report will function as the remedial action report for Group 5 activities.

6.4 CERCLA Five-Year Review(s)

Section XXII-22.1 of the FFA/CO states that "consistent with Section 121(c) of CERCLA, 42 U.S.C. 9621(c), and in accordance with this Agreement, U.S. DOE agrees that EPA may review response action(s) for OUs that allow hazardous substances to remain on-site, no less often than every five (5) years after the initiation of the final response action for such OU to assure that human health and the environment are being protected by the response action being implemented." DOE-ID 1994, Section 3.3.6, states: "The 5-year review process involves an evaluation as to whether the selected remedy remains "protective," in light of possible new standards, DOE-ID will evaluate, on a case-by-case basis, significant new requirements to ensure that the selected remedy does in-fact remain protective." Compliance with this review will require the development of a report providing information regarding the status of the response action and the need for additional action or work.

6.5 Routine Sampling and Monitoring Reports

The data developed from the routine (annual) sampling of the 11 wells monitoring the flux of contaminants out of INTEC, three wells monitoring contaminants below the HI interbed, and six plume monitoring wells will be used to produce a yearly report.

6.6 Treatability Study(ies) Final Report

Treatability studies will be conducted on wells that have a zone or zones projected to exceed MCLs in 2095 and where pump tests demonstrate that water production equal to or greater than 0.5 gpm for a 24-hour period is possible. Reports will be prepared to document the results of the tests performed. This report(s) will be prepared only if treatability studies are determined necessary.

7. REFERENCES

10 CFR 20, Appendix B, October 1975, "Concentrations in Air and Water Above Natural Background," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 61.92, December 1989, "Standard," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 61.93, December 1989, "Emission Monitoring and Test Procedures," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 122, "EPA Administered Permit Programs: The National Pollutant Discharge Elimination System," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 122.26, August 1995, "Storm Water Discharges," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 125, "Criteria and Standards for the National Pollutant Discharge Elimination System," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 141, July 1999, "National Primary Drinking Water Regulations," *Code of Federal Regulations*, Office of the Federal Register.

40 CFR 262.11, May 1995, "Hazardous Waste Determination," *Code of Federal Regulations*, Office of the Federal Register.

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